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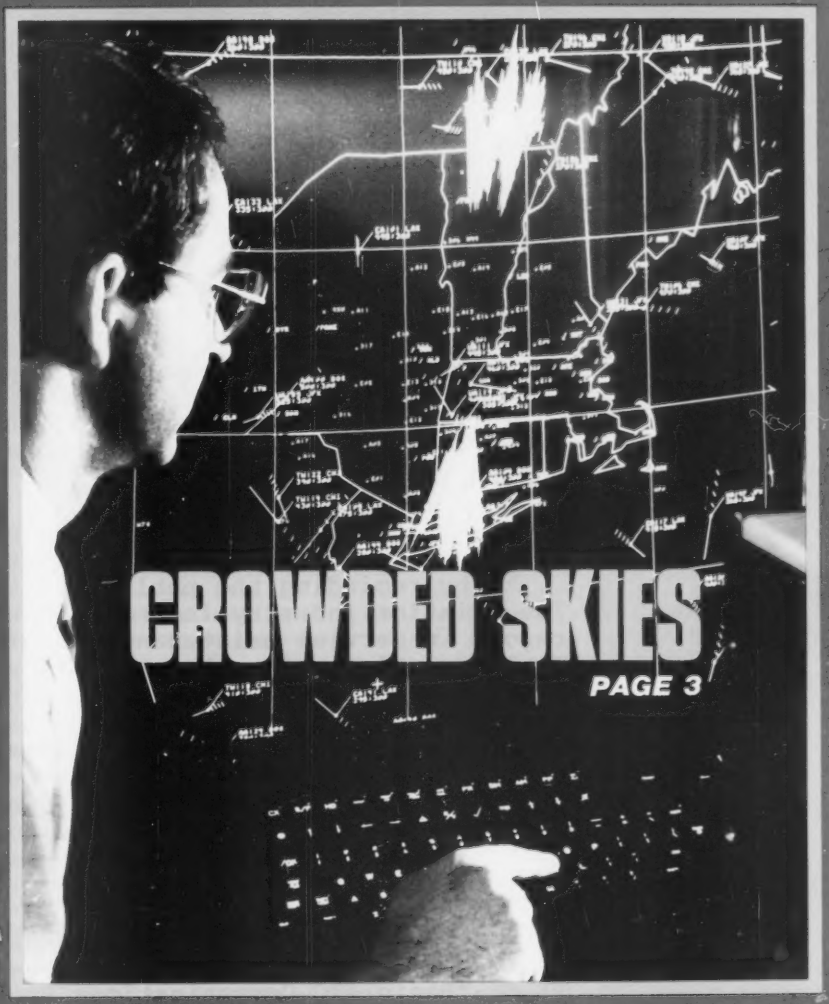

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Elizabeth Hanford Dole,
Secretary of Transportation
T. Allan McArtor, *Administrator, FAA*
Anthony J. Broderick, Assoc. Admin.,
Aviation Standards
Robert L. Goodrich, *Director,*
Flight Standards
Carol S. Rayburn, *Manager,*
General Aviation and Commercial Division
Gary D. Koch, Sr., *Manager,*
Accident Prevention Program Branch
David Gelfan, *Editor*
P.A. Duncan, Louise Oertly, *Associate Editors*

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BRIEFS

COCKPIT OBSCURATION. The nose gear of a Beech H18 retracted on landing as the aircraft was returning to base after total electrical failure. The pilot, who did not use a written checklist prior to takeoff, stated that the generator failure warning light was obscured from his vision by the control column and he was not aware that he had failed to turn on the generator switches.

PINPOINTING TROUBLE. Pilot preflight inspections usually include an examination of the external control hinges (flaps, ailerons, cowl flaps, etc.) but apparently not all pilots are aware of what they should be looking for. Hinged components should rotate smoothly with no significant back and forth movement--such movement usually indicates worn hinge pins, which could fracture or jam, if not replaced.

MUSEUM PIECE. The Voyager, which carried Dick Rutan and Jeana Yeager on their record-setting flight last December, will take its own place in history this fall. That is when it will be transported from its home in Mojave, CA to the Smithsonian's Air and Space Museum for permanent, public display. The 111-foot wingspan will fill the museum's south gallery, where the futuristic airplace will be suspended from the ceiling.

SDR REVITALIZATION. FAA is planning to the Service Difficulty Report (SDR) program by reminding the public of its existance. The aviation industry is required by regulation to report in-service maintenance problems to the FAA. Public participation, however, is voluntary and has declined steadily over the past few years. To bring the program back to the public's attention, brochures and audio-visual presentations have been distributed to local FSDO's for use at safety meetings. SDR forms can be obtained from any FAA flight standards district office and are postage-paid and should be addressed to the appropriate district office.

VFR RULES GUIDE. The AOPA Air Safety Foundation has produced a new pamphlet, "Basic ATC Communications Procedures." The booklet is a supplement to the Airman's Information Manual (AIM), the official FAA guide to flight information and air traffic procedures. Single copies are free from the AOPA Air Safety Foundation, 421 Aviation Way, Frederick, MD 21701. Additional copies (up to 25) are 50¢ each, plus $1.50 for postage and handling.

INTRODUCTION

CROWDED SKIES

"Crowded skies" is an expression heard widely around the country this summer, echoing press reports of frequent flight delays, computer saturation, and disturbing incidents. There is a popular impression that our aircraft have run out of sky room or at least that we at FAA have come up against inflexible barriers regarding our ability to maintain a constant flow of aircraft and a high standard of flight safety.

We believe this is a mistaken impression. The American National Airspace System is the busiest and most complex in the world, yet it is still the safest and most efficient. It is made up of equipment, techniques, skills, and regulations which have evolved over some 80 plus years of air transportation, yet it is constantly responsive to new challenges. At times the aviation industry has grown by leaps and bounds, sometimes creating a drain on the system's capacity, but that temporary lag has always been quickly overcome—as it is indeed being overcome today.

An efficient airspace system is such a complicated process that its problems cannot always be solved by simply hiring more people or buying more equipment. We learned that way back in the 1920's, when the Aeronautics Branch of the Department of Commerce attempted to certificate commercial aircraft by requiring a personal examination of each unit by a Federal inspector. As aircraft production expanded it was soon obvious that this was an impractical procedure which created a production log jam. We developed the type certification procedure, and it continues to serve us well today.

Similarly, aircraft navigational assistance evolved from "bonfires and beacons" to crude radio sets and eventually to a highly sophisticated avionics environment. Here, too, we have come up against the maxim that more is not always better.

When the deregulation of the air carrier industry began in 1978 and projections showed a rapid expansion in future air travel, the FAA initiated a comprehensive National Airspace System Plan for modernizing and improving air traffic control and airway facilities services through the year 2000. It was already evident to most of us that the era of aviation had also become the era of automation and high speed communication. To accommodate more aircraft within a given airspace it would be necessary to leave behind vacuum tube technology and move well into modern digital electronics. Reducing the time spent in radio transmissions, as well as expanding computer capacity, became prime objectives, which we are now beginning to achieve. The varied projects of the NAS Plan are too numerous to go into here, but we are moving steadily ahead to keep our place as the world's safest airspace.

However, even in this technologically advanced age of Mode S, TCAS, NAS Plans, and so on, one key element of the entire airspace system is the pilot. The pilot is ultimately responsible for his or her flight and its safe conduct, and he or she must never lose sight of that. All the electronics in the world are merely our assistants: they must not do the job for us. Flying is a dynamic event in which the pilot takes an active part, inside and *outside* the cockpit.

"Crowded skies" is the theme of this issue of *FAA Aviation News*, and we are presenting different outlooks from both inside and outside the agency. What follows is food for serious thought. As users of the airspace system, we are *all* responsible for helping to keep the airspace safe for everyone else. Collectively we must preserve what we have so carefully built since the winter day in 1903 when a crowded sky was Orville and Wilbur Wright and a few birds. ■

PART ONE

FOUR EYES ARE BETTER THAN TWO—

Or Are They?

... On 03/31/XX a PA–32T collided with a CE–172. The in-flight collision occurred approximately three to four miles north of the airport at an estimated altitude of 1,000 feet AGL. The PA–32T was on right downwind for runway 27R and the CE–172 had just departed runway 33. The aircraft collided head-on, left wing to left wing. The Cessna crashed into the roof of a warehouse and exploded, and the Piper hit the water and sank. A student pilot and instructor on board the Cessna and the pilot of the Piper received fatal injuries. Two people on the ground received serious injuries ...

—Excerpted from a preliminary accident brief

Recently, articles in FAA AVIATION NEWS, as well as in the industry and general press, have discussed the midair collision problem in general aviation. A decade ago an article in FAA AVIATION NEWS reported that in the overall picture of general aviation flying accidents, instructional flying accounted for a rather modest percentage of the serious accidents. Surprisingly enough, however, instructional flying is now involved in virtually the same number of midair collisions as personal flying—the category which is responsible for the greatest number of accidents of all kinds. There have been five recent mid-air collisions and in each case, at least one of the aircraft was involved in dual flight instruction. This change in the accident rate prompts us to ask ourselves a few questions about the flight instruction environment.

What is it that makes instructional flying as midair collision prone as personal flying?

To answer that question, one must look at the activity in the cockpit during an instructional (dual or solo) flight. The environment, both the cockpit of the aircraft and the air in which the flight is made, is foreign to the new student. The student is preoccupied with this new environment and is concentrating on the new vehicle controls, procedures, maneuvers, instruments, and terminology. Dividing attention between the inside and the outside interrupts that concentration. Until more experience is gained, students do very little scanning. Also, during a dual instructional flight, the student may feel that the instructor, the professional pilot in whom the flying public has great confidence, will keep the aircraft clear of all others.

On an endorsed solo flight, cross country or in the traffic pattern, the student is trying to remember how to do a maneuver and to recall the instructor's reminders for the flight. Once again, the student may feel that interrupting his or her concentration by scanning is the greater of two evils.

During a one-hour flight in the practice area, for example, it would not be unusual for a student not to see another aircraft except in the vicinity of the airport. The aircraft are probably there and noticed by the instructor, but because the student's focus initially is inside the cockpit, he or she might forget that traffic is present. A good instructor will break that false security right away.

When operating a motor vehicle, a person is accustomed to expecting other vehicles converging from the front, back, or at inter-

sections. Traffic is perceived only from two dimensions, and that becomes highly ingrained in driver behavior. People who take up flying have not dealt with vehicles approaching from odd angles—from above or below—in addition to front, back, and side. Pilots must perceive traffic in three dimensions, and that is a behavior that requires some "unlearning" of previous habits, always a difficulty.

Also while operating an automobile, people need only coordinate steering with acceleration. They are not accustomed to maintaining an altitude, keeping wings level, maintaining a heading, preventing a stall, or coordinating controls. Again, all this new stimuli result in the student's concentration remaining inside the cockpit for long periods of time.

During initial training in the operation of any piece of mechanical equipment, it is not unusual for a person to look at a control before actuating it for verification. With experience, the control is operated automatically with physical sensation supplying the feedback on correct operation. The same is true for pilots, who will reach for a control instinctively and verify with a peripheral, not concentrated glance. A student pilot's inexperience will force him or her "back into the cockpit" for control verification during the first few training sessions.

Even the most conscientious instructor often has a tendency to spend too much time in the cockpit giving instruction and feedback and checking the student's performance. Spending time scanning means you cannot verify that an instruction has been performed correctly.

During the dual instructional flight, aren't four eyes better than two when it comes to midair collision prevention?

Yes, but, as indicated above, only if *both* sets of eyes are scanning for other aircraft. There may be times when there are no eyes looking outside the cockpit for a period of time. The instructor is usually the PIC during an instructional flight and, as such, is the person responsible for the safe operation of the aircraft, including the prevention of a midair collision. The instructor must be continually aware of the need to scan for other aircraft *and must continually remind the student to do so* for the continued safe operation of the flight. Only through repetition will the student learn the need to scan and how to scan. The example set by the flight instructor will stay with the student throughout his or her flying career.

What is there about instructional flying that is different from personal flying?

The basic operation of the aircraft is not different, but the mental set and eventual results may be entirely different. During an instructional flight, the student is concentrating on the improvement of skills and perfecting aircraft control to maintain altitude, heading, airspeed, course, and attitude. This concentration requires the monitoring of the instruments which will tell if the control actions are producing the desired results. The pilot involved in personal flying may not be so concerned with the precision of flight as with its enjoyment. The pleasure-flying pilot tends to be "out of the cockpit" more and taking in the view. This normal interest in the surroundings will result in the pilot unconsciously scanning the area more often and with more likelihood of detecting other aircraft.

However, if the student pilot has been taught proper scanning procedures during training, he or she will integrate looking at the surroundings with the instrument crosscheck. Scanning will be done systematically, which will aid in the prevention of a midair collision.

What can be said about the less desirable instructor habits that are picked up by the student during training?

Many FAA inspectors and designated pilot examiners have remarked that they know the applicant's instructor by the way the applicant flies during a practical test. The instructor's habits, both good and bad, are mimicked by the student. These habits are not consciously taught by the instructor, but they are learned by the student. What a student generally believes is, "What's good enough for my instructor is good enough for me." Instructors must give deep thought to their habits and patterns, and try to eliminate the negative ones before they are passed on to a student. One habit an instructor should consciously and unconsciously impart is scanning to avoid midair collisions. The accident prevention concerns of the flight instructor become the accident prevention concerns of the student.

As stated in a 1976 FAA AVIATION NEWS article, "No one wants to worry a student to the point where he or she is so concerned about other aircraft that he or she cannot learn to fly the aircraft. The degree of responsibility for scanning expected of a student is a matter of instructor judgement, but it should be clearly indicated and steadily reinforced. The most valuable instrument every pilot must learn to use—and rely on—is the pilot's eyes."

A midair collision can spoil your whole day. ■

Prepared by Bernard A. Geier, Executive Director, National Association of Flight Instructors.

PART TWO

THE VIEW FROM AIR TRAFFIC

Being Seen Is Nice, But ...

Conspicuity studies in both the aviation and automobile industries have demonstrated the value of highly visible colors on aircraft and automobiles. In that context, it is important to us that we can "be seen" easily by other aircraft near us. However, being highly visible is only supplemental to the responsibility that pilots have to actively avoid other traffic, and relying solely on physical conspicuity can be a real problem, especially when camouflaged high-speed military aircraft are involved. The responsibility on each of us as pilots (whether general aviation, commercial, or military) is to see and *avoid* other traffic.

According to the *FAA Pilot/Controller Glossary*, "see and avoid" is a visual procedure where pilots flying in visual conditions—regardless of flight plan type—are charged with responsibility to observe the presence of other aircraft and to maneuver themselves as required to avoid other aircraft (or obstructions). Thus, see and avoid means the pilot must not only maintain active vigilance for other traffic but must also *act* positively to avoid a conflict. Being seen is nice, but it *will not* keep you out of harm's way like avoiding other traffic will.

Beware the Warm and Fuzzy

What if you are in "radar contact?" The "warm and fuzzy" feeling we get when air traffic control tells us "radar contact" is a tribute to the controllers in the ATC system who have provided us such super service that we tend to forget that "radar contact" does not change our need to protect ourselves from "unknown" traffic.

Outside positive control airspace, ATC provides radar traffic information *to radar identified* aircraft on a workload permitting basis. Also, ATC issues a safety alert to any aircraft under their control *if ATC is aware* the aircraft is at an altitude believed to place the aircraft in unsafe proximity to terrain, obstructions, or other aircraft. To do so, however, *ATC must be aware* of the condition. ATC's awareness is contingent upon many factors, including ability (or inability) of ATC radar to see nonparticipating aircraft in the area. Since many users of the airspace choose not to partake of ATC services, much of the traffic outside positive control airspace may be unknown to ATC.

"Radar contact" simply means ATC sees that aircraft with which they have specifically established radar contact and not necessarily any others operating in the same area. ATC's responsibility for separating aircraft is generally limited to those aircraft under their control. Outside airspace, such as Positive Control Areas, Terminal Control Areas, Airport Radar Service Areas, ATC's responsibility to separate even IFR aircraft from other traffic (i.e., traffic *not* under their control) is limited.

But Doesn't ATC ...?

The ATC system is restrained both by the physical capabilities of the system (nonparticipating aircraft not always visible on radar, etc.) and by regulatory or procedural constraints that preserve for the pilot those functions, roles, and responsibilities traditionally and properly belonging to the pilot-in-command.

The procedural requirement for ATC to issue traffic advisories does not relieve pilots of their responsibility for continued vigilance or to "see and avoid" other aircraft. As indicated in the *Airman's Information Manual*, "The issuance of traffic information as observed on a radar display is based on the principle of assisting and advising a pilot that a particular radar target's position and track indicates it may intersect or pass in such proximity to his intended flight path that it warrants his attention. This is to alert the pilot to the traffic so that he can be on the lookout for it and thereby be in a better position to take appropriate action should the need arise."

In other words, the issuance of traffic advisories simply provides a pilot with another set of eyes, so to speak, to assist him or her in locating potentially conflicting traffic. That is the proper role for ATC, but eyes looking out the cockpit window remain one of the best accident prevention methods yet devised.

The Bottom Line

See and avoid is more than just a catchy phrase; it is a rule for flying. More than that, it is a concept to *live* by. ■

Article prepared by B. Frank Barron, ATC Specialist, ATO–330, En Route Procedures Branch.

PART THREE

How To Avoid A Midair Collision

By definition and function, the human eye is one of the most important and complex systems in the world. Basically, its job is to accept images from the outside world and transmit them to the brain for recognition and storage. In other words the organ of vision is our prime means of identifying and relating to what is going on around us.

It has been estimated that 80% of our total information intake is through the eyes. In the air we depend on our eyes to provide most of the basic input necessary for performing during a flight—attitude, speed, direction, and proximity to things, like the ground or opposing air traffic that may constitute a danger of in-flight collision. As air traffic density and aircraft closing speeds increase, the problem of in-flight collision grows proportionally, and so does the importance of the "eyeball system." A basic understanding of the eyes' limitations in detection is probably the best insurance a pilot can have against running into another airplane.

LIMITATIONS OF THE EYE

The eye, and consequently vision, is vulnerable to just about everything: dust, fatigue, emotion, germs, stray eyelashes, age, optical illusions, and the alcoholic content of last night's party. In flight our vision is also altered by atmospheric conditions, windshield distortion, too much or too little oxygen, acceleration, glare, heat, lighting, aircraft design, and so on. Most of all, the eye is vulnerable to the vagaries of the mind. We can identify only what the mind lets us see. For example, a daydreaming pilot staring out into space sees no approaching traffic and is a likely candidate for an in-flight collision.

One function of the eye that is a source of constant problems to the pilot (though he or she is probably never aware of it) is the time required for accommodation. Our eyes automatically accommodate for (or refocus on) near and far objects, but the change from something up close, like a dark instrument panel two feet away to a well-lighted landmark or aircraft a mile or more away, takes one to two seconds or longer for accommodation. That may not seem like a long time until you consider that you need 10 seconds to recognize a potential collision threat, decide what to do, and take action.

Another focusing problem usually occurs at very high altitudes, but it can happen even at lower levels on vague, colorless days above a haze or cloud layer when no distinct horizon is visible. If there is little or nothing to focus on at infinity, the eye will not focus at all. We experience something known as "empty-field myopia;" we stare but see nothing, even opposing traffic, if it should enter our visual field.

Another inherent problem is our narrow field of vision. Although our eyes accept light from an arc of nearly 200°, they are limited to a relatively narrow area (approximately 10–15°) in which they can actually focus on and classify an object. Though we can perceive movement in the periphery,

we cannot identify what is happening out there, and we tend not to believe what we see out of the corner of our eyes. This, aided by the brain, often leads to "tunnel vision."

This limitation is compounded by the fact that at a distance an aircraft on a collision course will appear to be motionless. It will remain seemingly stationary without appearing to move or grow in size for a relatively long time. Then, it will suddenly bloom into a huge mass filling one of your windows. This is called the "blossom effect." Since we need motion or contrast to attract our eyes' attention, this becomes a frightening factor when you realize that a large bug smear or spot of dirt on the windshield can hide a converging plane until it is too close to be avoided.

In addition to the built-in problems, the eye is also severely limited by environment. Optical properties of the atmosphere alter the appearance of traffic, particularly on hazy days. "Limited visibility" really means "limited vision." You may be legally VFR when you have three miles, but at that distance on a hazy day, opposing traffic is not easy to detect. At a range closer than three miles, even though detectable, traffic may not be avoidable.

Lighting also affects our vision. Glare, usually worse on a sunny day over a cloud deck or during flight directly into the sun, makes objects hard to see and scanning uncomfortable. Also, an object that is well lighted will have a high degree of contrast and will be easy to detect, while one with low contrast at the same distance may be impossible to see. For instance, when the sun is behind you, an opposing aircraft will stand out clearly, but when you are looking into the sun and your traffic is backlighted, it is a different story—the old "Beware the Hun from the Sun" syndrome. Another contrast problem is trying to find an airplane in a cluttered background. If it is between you and terrain that has an extensive color variation or is heavily dotted with buildings, it will blend into the background until it is quite close.

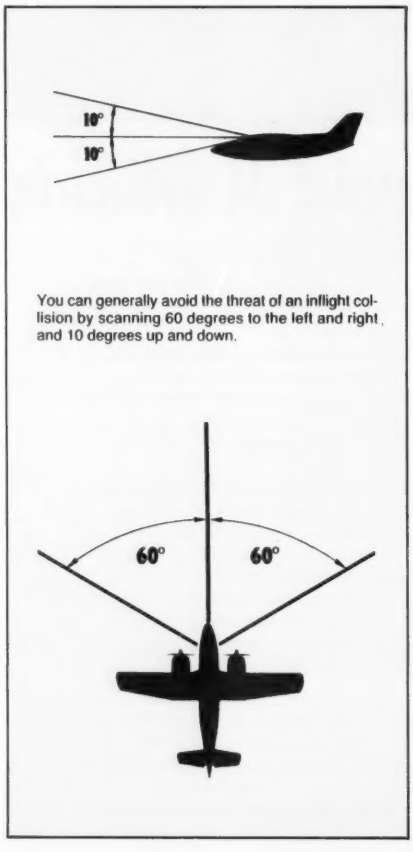
And, of course, there is the mind, which can distract us to the point where we do not see anything at all or which can lull us into cockpit myopia—staring at one instrument without even seeing it. How often have you filed IFR on a VFR day, settled back at your assigned altitude with the autopilot on, and then never looked outside, feeling secure that ATC will protect you from all harm? *Don't you believe it!* Remember our radar system has its limitations, too. It is fine to depend on instruments but not to the exclusion of the see-and-avoid system, especially on days when there are pilots not under radar surveillance or control flying around in the same sky.

As you can see, visual perception is affected by many factors. It all boils down to the fact that pilots, like anyone else, tend to overestimate their visual abilities and to misunderstand their eyes' limitations. Since the primary cause of in-flight collisions is the failure to see and avoid, we can conclude that the best way to avoid traffic is to learn how to use our eyes in an efficient, external scan.

HOW TO SCAN

What is the perfect scan? There is no one scan that is best for all pilots. The most important thing is for each pilot to develop a scan that is both comfortable and workable for him or her in each aircraft he or she flies.

The best way to start is to get rid of bad habits. Naturally, not looking out at all is the poorest of scan techniques, but glancing out at intervals of five minutes or so is also poor when you remember that it only takes seconds for a disaster to happen. Check yourself the next time you are climbing out, making an approach, or just bouncing along over a long cross-country route. See how long you go without looking out the window. Glancing out and giving it the old once-around without stopping to focus on anything is practically useless; so is staring at one spot for long periods of time.



You can generally avoid the threat of an inflight collision by scanning 60 degrees to the left and right and 10 degrees up and down.

So much for the bad habits. Now that you know what they are, you can consciously avoid them. You learn how to scan properly first by knowing where to concentrate your search. It would be preferable, naturally, to look everywhere at once, but, since that is not practical, concentrate on the areas most critical to you at any given time. In the traffic pattern especially—where most midairs happen—clear yourself before every turn, and always watch for traffic making an improper entry to the pattern. On descent and climbout, make gentle S-turns to see if anyone is in your way. During that very critical final approach stage, look behind and below at least once. Avoid tunnel vision: Pilots often rivet their eyes to the point of touchdown, but you may never arrive there if another pilot is aiming for the same numbers at the same time. Make clearing turns, too, before maneuvers in the practice area, such as stalls, lazy-eights, chandelles, etc.

In normal flight you can generally avoid the threat of an in-flight collision by scanning an area 60° to the left and right of your center visual area. This does not mean you should forget the rest of the area you can see from your side windows every few scans. Horizontally, the statisticians say, you will be safe if you scan 10° up and down from your flight vector (Figure 1). This will allow you to spot any aircraft at an altitude that might prove hazardous to you, whether it is level with you, below and climbing, or above and descending. The slower your plane, the greater your vulnerability; hence, the greater scan area required.

Bear in mind that your eyes are subject to optical illusions and can play some nasty tricks on you. At one mile, for example, an aircraft flying below your altitude will appear to be above you. As it nears, it will seem to descend and go through your level, yet, all the while it will be straight and level below you. One in-flight collision occurred when the pilot of the higher airplane apparently experienced this illusion and dived his plane right into the path of the aircraft below.

Though you may not have much time to avoid another aircraft in your vicinity, use your head when making defensive moves. Even if you must maneuver to avoid a real in-flight collision, consider all the facts. If you miss the other aircraft but stall at a low altitude, the results may still be the same.

SCAN PATTERNS

Your best defense against in-flight collisions is an efficient scan pattern. Two basic scans that have proved best for most pilots are collectively called the "block" system. This type of scan is based on the theory that traffic detection can be made only through a series of eye fixations at different points in

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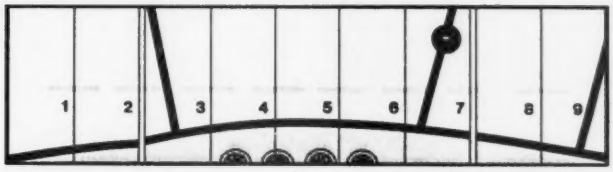
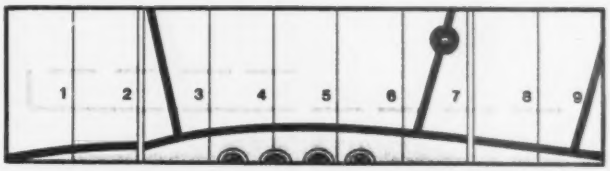


Side-to-side scanning method. Start at the far left of the visual area and make a methodical sweep to the right, pausing in each block of viewing area to focus your eyes. At the end of the scan, return to the instrument panel.



Front-to-side scanning method. Start in the center block of your visual field (center of front windshield); move to the left, focusing in each block, then swing quickly back to the center block after reaching the last block on the left. Repeat the scan to the right after scanning the instrument panel.

space. Each of these fixes becomes the focal point of your field of vision (a block 10–15° wide). By fixating every 10–15° you should be able to detect any contrasting or moving object in each block. This gives you nine to 12 blocks in your scan area, each requiring a minimum of one to two seconds for accommodation and detection. (Any scanning system includes a scan of the instrument panel as well. Wherever this falls in the scanning technique you develop, it should take no more than four to five seconds.)

One method of block scan is the *side-to-side* motion. Start at the far left of your visual area and make a methodical sweep to the right, pausing in each block to focus. At the end of the scan, return to the panel.

The second form is the *front-to-side* version. Start in the center block of your visual field (approximately the center of the front windshield before the pilot). Move your eyes to the left, focusing in each block, swing quickly back to the center block, and repeat the performance to the right, once again, concluding with the instruments.

COLLISION AVOIDANCE CHECKLIST

Collision avoidance involves much more than proper eyeball techniques. You can be the most conscientious scanner in the world and still have an in-flight collision if you neglect other important factors in the overall see-and-avoid picture. It might be helpful to use a "collision avoidance checklist" as religiously as you use the pretakeoff and landing checklists. Such a checklist might include the following nine items.

Check yourself. Start with a check of your own condition. Your eyesight, and consequently your safety, depend on your mental and physical condition.

Plan ahead. Plan your flight ahead of time. Have charts folded in proper sequence and within handy reach. Keep your cockpit free of clutter. Be familiar with headings, frequencies, distances, etc., ahead of time so that you spend minimum time with your head inside the cockpit. Check your maps and NOTAM's for restricted areas, intensive student jet training areas, and other high density spots.

Clean windows. During the preflight, make sure your windshield is clean. If possible, keep all windows clear of obstructions, such as solid sun visors and curtains.

Adhere to SOP's. Stick to Standard Operating Procedures and observe the regulations of flight, such as correct altitudes and proper traffic pattern practices. You can get into big trouble, for instance, by "sneaking" out of your proper altitude as cumulus clouds begin to tower higher and higher below you or by skimming along the tops of clouds without observing proper separation. Some typical situations involving in-flight mishaps around airports include: entering a righthand pattern at an airport with lefthand traffic; entering downwind so far ahead of the traffic pattern that you interfere with traffic taking off and heading out in your direction. In many in-flight collisions at least one of the pilots involved was not where he was supposed to be.

Avoid Crowds. Avoid crowded airspace en route, such as directly over a VOR. You can navigate on VFR days just as accurately by passing slightly to the left or right of the station. Pass over airports at a safe altitude, being particularly careful within a 25-mile radius of military airports and busy civilian fields. Military airports usually have a very high concentration of fast-moving jet traffic in the vicinity and a traffic pattern that extends to 2,500 feet AGL. Jets in climbout may be going as fast as 500 mph.

Compensate for design. Compensate for your aircraft's design limitations. All planes have blind spots; know where they are in your aircraft. For example, a highwing aircraft that has a wing down in a turn blocks the area you are turning into. A low wing blocks the area beneath you. One of the most critical potential midair situations is a faster low-wing airplane overtaking and descending on a highwing airplane on final approach.

Equip for safety. Your airplane can, in fact, help avoid collisions. Certain equipment that was once priced way above the light airplane owner's reach is now available at reasonable cost. High intensity strobe lights increase your contrast by as much as 10 times day or night. In areas of high density, use your strobes or your rotating beacon constantly, even during daylight. (See the article, "Operation Lights On" in the September/October 1986 FAA GENERAL AVIATION NEWS.) Transponders significantly increase your safety by allowing radar controllers to keep traffic away from you and vice versa. Now mandatory for flight into certain high density areas, transponders also up your chances of receiving radar traffic advisories, even on VFR flights.

Talk and listen. Use your radios, as well as your eyes. When approaching an airport, whether or not you intend to land, call in 15 miles out and tell them your position, altitude, and intentions. Find out what the local traffic situation is. At an airport with radar service, call the approach control frequency and let them know where you are and what you are going to do. At uncontrolled fields, use the appropriate Common Traffic Advisory Frequency (CTAF). Since detecting a tiny aircraft at a distance is not the easiest thing to do , make use of any hints you get on the radio. A pilot reporting his position to a tower is also reporting to you. Also, your job is much easier when an air traffic controller tells you traffic is "three miles at one o'clock." Once you have that particular traffic, by the way, remember the rest of the sky. If your traffic seems to be moving, you are not on a collision course, so continue your scan and watch that traffic from time to time. If it does not appear to move, however, we suggest you watch it very carefully and get out of its way, if necessary.

Scan! The most important part of your checklist, of course, is to keep looking where you are going and watch for traffic. Make use of your scan constantly.

Basically, if you adhere to good airmanship, keep yourself and your airplane in good condition, and develop an effective scan, you should be able to avoid in-flight collisions. As you learn to use your eyes properly, you will benefit in other ways. Remember, despite their limitations, your eyes provide you with color, beauty, shape, motion, and excitement. As you train them to spot minute targets in the sky, you will also learn to see many other important "little" things you may now be missing, both on the ground and in the air. If you couple your eyes with your brain, you will be around to enjoy these benefits of vision for a long time. ■

This article is based on the pamphlet, "How to Avoid a Midair Collision," an AOPA handout which accompanies the popular Accident Prevention Program, "Take Two and See." Contact your local Accident Prevention Specialist for the next scheduled showing of this program.

There are times when the sky can be very unforgiving—especially when pilots (whether they are flying a single engine puddle jumper or a jumbo jet) make an error. Often the results are tragic. Fortunately, many errors are of the correctable variety, and no one is hurt. But the persons involved tend to think that they could not have been so stupid; the most neophyte of pilots would have known better. Experience has little to do with it. Errors fall into the same categories all the time, and the root cause for many of them is plain, old-fashioned complacency.

The following quotes are excerpted from *Callback* (a monthly safety bulletin derived from NASA's Aviation Safety Reporting System). They were printed earlier this year with the instructions: "Reading these frank confessions should aid others in maintaining a constant guard—regardless of fatigue, distraction, the temptation of complacency—against all the forms of carelessness lying in wait to trap the unwary." All we can add is, "The more things change, the more they stay the same!"

- ... result of habit developed from flying the same route nightly for months ... It helped to shatter my complacency without shattering my airplane.
- ... I failed to consider that: 1. Temperature was relatively cool; 2. Aircraft was light—higher than normal rate of climb; 3. First Officer was not experienced in this aircraft.
- ... We didn't question the heading because of long day—deadheading, flying for eight hours of flight time. Shouldn't let guard down.
- ... Once level at 6000' ATC asked us to verify our altitude. Then he said that he had issued 5000. We told him that we had read back 6000. He said he did not catch that readback....
- ... Cleared for the visual, our final approach controller failed to turn us over to Tower and we failed to contact them until after clearing the runway.
- ... Contributing factors: First Officer was a new hire but was a highly experienced airman who had flown as Captain on turbojet equipment for another carrier. Captain was lulled into a false sense of security.
- ... reason for deviation was an interruption in the usual departure sequence.
- ... training new copilot and forgot to switch to Tower for landing clearance.
- ... had not changed to Tower frequency. We are getting too used to just doing what we are told.
- ... after eight hours on duty slow in trying to resolve problem ... We had minimum rest the night before. Last leg of three day trip!
- ... it was midnight and we had been on duty for 13 hours. This was the sixth leg of the day, third day of flying, and we were 1:30 late ...
- ... the lesson learned is that when flying a new type airplane, don't depend on all the computer systems to always give correct information and—most of all—don't get so engrossed in one phase of flying you forget all the others. Remember AVIATE, NAVIGATE, COMMUNICATE in that order. ■

FAA's New Faces

T. Allan McArtor was sworn in as FAA Administrator on July 27, 1987. He succeeded Donald D. Engen who resigned July 2. Before his appointment by President Reagan on June 5, 1987, McArtor was Senior Vice President of Telecommunications for Federal Express. All of the company's domestic and international telecommunications networks were his responsibility. He also served as Chairman of the Department of Transportation's Commercial Space Transportation Advisory Committee from July 1986 to June 1987.

He joined Federal Express in 1979 and held various executive positions in its aviation and advanced technology divisions. These included Vice President for Systems Operations, Vice President for Advanced Projects and Research, and Vice President for the Satellite Systems Division.

McArtor graduated from the U.S. Air Force Academy in 1964 with a BSE degree in Aeronautical and Astronautical Engineering and received an MSE degree in Engineering Mechanics from Arizona State University in 1971. He was a fighter pilot in Vietnam, logging over 200 combat missions and winning the Silver Star and Distinguished Flying Cross for heroism. From 1972 until 1974 he flew with the Air Force Precision Flying Team, the "Thunderbirds."

McArtor serves on the Board of Directors of the Air Force Association, the American Institute of Aeronautics and Astronautics, and the American Astronautics Society. During his years in the Air Force Academy, he was elected to Tau Beta Pi, an engineering honor society, and now serves on its Board of Directors.

The youngest FAA Administrator, Mr. McArtor was born in St. Louis, MO on July 3, 1942. He and his wife, Grace, have two sons, Andrew and Scott. Andrew is a member of the Class of 1990 at the Air Force Academy, and Scott is in high school. ■

Robert L. Goodrich is on board as the new Director of Flight Standards, AFS–1. Mr. Goodrich's aviation career began in 1952 when he joined the U.S. Air Force. After leaving military service in 1957, he worked in the aviation industry until joining the FAA in 1960 as an air traffic control specialist in the Cleveland ARTCC and later in Great Falls, MT. For six years beginning in 1967, Mr. Goodrich was an Airspace System Inspection Pilot based in Minneapolis, MN. He moved to the Flight Inspection Branch in FAA Headquarters in 1973, working there until 1977 when he became Chief of the Aircraft Management Branch in the Pacific-Asia Region (now the Western-Pacific Region). In 1978, Goodrich became Chief of the Flight Standards Division in the same region.

For the past seven years until his appointment as Director of Flight Standards, Mr. Goodrich was first Assistant Chief then Chief of the Flight Standards Aeronautical Field Office at the Mike Monroney Aeronautical Center in Oklahoma City, OK.

Holder of a Commercial Certificate with Instrument and Multiengine ratings, Mr. Goodrich was educated at Roosevelt City College in Chicago, IL, the Illinois Institute, and the USAF Officers Training and Flying School. He brings to Flight Standards a well-rounded aviation and managerial background, which has been recognized by numerous awards. The latest was the 1985 Special Secretarial Award from the Department of Transportation for support of women in government.

Mr. Goodrich was born in Greenville, OH on November 3, 1932. He and his wife Paula, a real estate broker, have two married daughters. ■

Charting History

The VFR aeronautical charts and instrument charts pilots use for navigation are generally taken for granted. They arrive on a regular basis, have a high degree of accuracy, and are indispensible for safe navigation. They are the most easily identifiable piece of the pilot's paraphernalia, and they are used everywhere except the traffic pattern. Because of their universal presence as an integral aspect of safe flight, let us pause a moment and wonder, "Just where did charts come from?"

When man started flying he used landmarks to get from one place to another. Eventually, some of these landmarks were put into map form by the pilots themselves for their personal use, but these maps were highly unofficial and inconsistent. In 1922 the first official (i.e., from the government) aeronautical map was produced by the U.S. Army for military use. Civilian pilots used bootlegged copies or their own, crude creations or none at all. However, in the mid 1920's navigation changed from seat-of-the-pants to state-of-the-art.

In 1925 the first aeronautical beacons came into use, followed in 1926, when the Air Commerce Act became law, by light beacons. These beacons covered routes which stretched approximately 2,000 miles across the country. Despite the relatively vast coverage of this navigational system, it was only effective at night and when visibility was good, but, necessarily, pilots had to be able to find the beacons in order to use them. In response the first airway map was published by the Coast and Geodetic Survey in 1927. This was Airway Map No. 102, Dallas to Oklahoma City, the first strip map. (Strip maps showed only narrow sections of terrain and were wound and unwound on a set of rollers as the flight progressed.)

The number of strip maps increased to reflect the increase in air transportation. However, there was much overlapping and duplication. For example, there were six strip maps for the Chicago area alone, all offering much the same information, but from a different direction. A new series, the Area Charts, was developed. This group of charts was designed to cover the entire United States with as little duplication as possible.

So, in 1930 two major aviation events happened. The first airport control tower was built in Cleveland, OH and the first Sectional Aeronautical Chart was published by the U.S. Coast and Geodetic Survey. These were the ancestors of the sectionals used today, and the World Aeronautical Chart (WAC's) series was added a few years later.

Aviation radio equipment was being developed very quickly, and now pilots could use not only landmarks but also radio aids in navigation. Once again, before they could use these "space age" marvels, they needed information about them. Radio aid information was added to sectionals and WAC's, and two new types of charts appeared, the Instrument Approach and Landing Charts (predecessors of Instrument Approach Procedures) in 1942 and Radio Facility Charts in 1943.

During the 1950's when aircraft began to fly higher and faster, the first high altitude charts were issued. The sectional and WAC's were considered low altitude charts, and, briefly for flights between the coverage area of the Low and High Altitude Charts, the Intermediate Altitude Chart was introduced in February 1961. These were later phased out because operational demand for them was limited and because they did not supplement current airspace configurations.

By 1960 there were 87 VFR Sectional Charts covering the conterminous United States. However, to fly from San Diego, CA to Seattle, WA, roughly 1,000 miles, a pilot needed eight charts—charts were only printed on one side. In the late 1960's the charts were printed back to back to lower the number of charts the pilot needed to cover the same area. (Now, for example, only three charts are needed for the San Diego to Seattle trip.) By 1970 there were only 37 VFR Sectional charts needed to cover the conterminous United States.

The responsibility for developing U.S. standards for aeronautical charts is with the Cartographic Standards Section of FAA's National Flight Data Center. Staff experts have backgrounds in compilation, editing, production, and distribution and are well-suited to develop national standards. They are also responsible for representing civil aviation requirements for charted information and products and for developing government aeronautical chart specifications. Changes to the specifications are worked out with the Defense Mapping Agency, which represents the military, and the National Ocean Service (NOS). NOS produces and distributes government charts.

Information used to update charts generally comes from airport operators, airspace and procedures specialists in the FAA, air traffic control facilities, the Federal Communication Commission (FCC), the Geodetic Survey, and many more who are interested in safe navigation. The data is submitted to the National Flight Data Center in FAA Headquarters where it is verified by Aeronautical Information Specialists then forwarded to NOS for application to the charts. If NOS notes any problems, FAA is notified, and NOS and FAA work together to provide pilots with the most useful, safest charts available.

FAA and NOS cartographers who maintain aeronautical charts do it for the most part because they enjoy aviation as well as charting. Many are pilots who have an in-depth knowledge of aviation as well as design, function, and application of aeronautical data to charts.

We have seen where charts have been, but where are they going? So called "glass cockpits" of modern airliners employ computerized navigation systems which have charts and approaches ingrained on microchips and instantly accessible at the touch of a few buttons. Autopilots and automated landing systems coupled with these computers almost eliminate the need for a hard copy. That may beat folding and refolding (always a joy when you are trying to fly with one hand and fold with the other), but the traditional sectional and instrument charts will be around for a long time to come, even in glass cockpits as a reliable back-up. As with any tool, charts will continue to evolve and change with the times and with pilot needs. Readability and utility may be improved through extensive research and psychological study, but charts will remain our most easily recognized and faithful flying companions. ■

This article was based on information provided by the National Ocean Service (NOS).

The air exhibition had been hastily arranged by his own admission. He had advertised eight hours of aerial entertainment, but when he found out the professional airshow pilots he had promised were not available, there were only two alternatives. He could go on without them or cancel the airshow altogether. Not being a quitter by nature, the makeshift airshow launched not only the reopening of Kewanee Airport but also the aerobatic career of Duane Cole.

From the time Duane saw his first airplane fly over his parents' Illinois farm in 1919, his five year old mind knew he was destined to fly. He made wings of newspaper tacked to an old screen door; he converted his coaster wagon to be the fuselage; and his brothers were the propulsion for the downhill flight. Later, he "improved" the wing design using fishing poles and bed sheeting. Launching from the hay barn seemed a bit too high, so the chicken coop was chosen as the logical, and safer, alternative. On his maiden flight, he executed an unintentional Lomcevak (end over end tumble) on takeoff and surprisingly walked away from it with only a few bruises. (Of course, it was years later before he learned what a Lomcevak was, but the child demonstrated the man's talents instinctively.) It would not be until 1928 that the 14 year old Duane would spend $1.50 for his first airplane ride. Then, the Depression struck, flinging the dreams of millions out of reach, and Duane was no exception. Almost 10 years would pass before he would become a pilot.

Those years were pretty lean while he was growing up. Flying lessons were a luxury that came under the spare cash category. As jobs and money were scarce, it was not until Christmas Day 1935 that Duane had enough to spare to treat himself to his first real flight lesson. It would take him three and a half years to get his pilot's certificate. The added responsibility of marriage and a baby had slowed down the process, but his 20 year old dream finally came true.

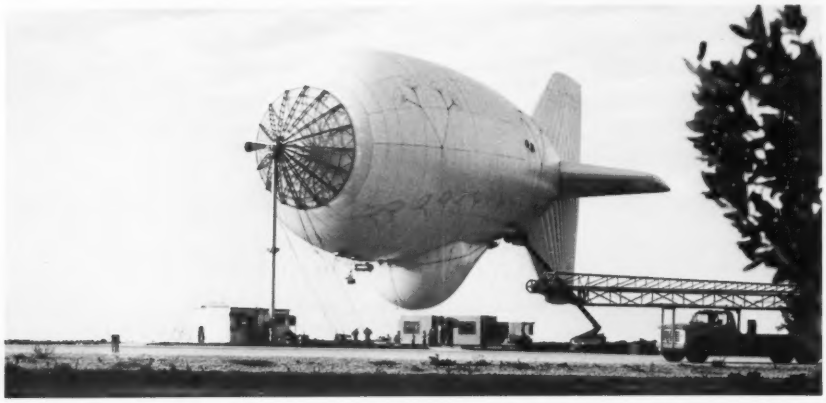
After getting his certificate, a family council was called. The decision was made for him to go for his commercial and instructor certificates, as money and circumstances permitted, as that was the only way he could pursue a career in aviation. By July 1940 his goals had been reached and he was ready to go.

Early in his flight instructing and air taxi career, Duane learned two things that would stay with him. "First, in aviation the customer is never right if the pilot thinks he is not. Secondly, and most importantly, I learned you do not have to get anywhere at any given time." Safety first would become and remain his watch word.

Part of his first instructing job entailed being chief flight instructor for the Civilian Pilot Training Program (CPT) at Northern Illinois Teachers College. When this job folded, Duane looked toward California where he heard the schools were hiring civilian instructors to train pilots for the expanding Army Air Corp. Upon arrival he found rumors had been false. However, the flight school at Ontario Municipal Airport was looking for an aerobatic instructor for the CPT program there. As Duane had taken a secondary flight in aerobatics before he left Illinois, he was qualified and was made chief pilot of the program.

On December 7, 1941, the freewheeling days of aviation came to a grinding halt. All civilian flights (except for airlines) were banned within 150 miles of the west coast. The CPT program was relocated beyond these limits so the courses could be completed. When they ended Duane again applied for a job training military pilots, and this time he was accepted, even after a flight test where he was told he would never be any good at teaching or performing aerobatics. At first he taught only Royal Air Force cadets, but early in 1943 the Polaris Flight

(continued on back cover)



A WIDE BERTH. Fourteen miles northeast of Key West, FL, the 23rd Air Division has tethered an aerostat radar system surveillance balloon. As reported in the last issue of FAA AVIATION NEWS, restricted area R–2916 is four miles in diameter and extends up to 14,000′ MSL. The restricted area is in continual use by the balloon, which is slightly larger than the Goodyear blimp. While the aerostat is airborne, it is lighted with strobes; however, its tether is unmarked. Civilian aircraft have intruded (some as close as 500′) without authorization, and while the balloon envelope itself is highly distinct and visible, officials are concerned about aircraft striking the tether, especially at night. So steer clear!

COMMENTS FROM FAA'S NEW ADMINISTRATOR

T. Allan McArtor, FAA's newly sworn administrator, was presented Monday, July 27 to FAA employees at Headquarters in Washington, DC and throughout FAA's nine regions by satellite link. Mr. McArtor had some very interesting and thought-provoking things to say. Following are some excerpts.

"... I get asked frequently by people everywhere, 'Is flying safe?' Of course, I can answer, 'Yes, unequivocally. Flying is safer than any other mode of public transportation.' I can trot out statistics, and I can compile charts, but the important point is that the numbers don't answer the real questions. People ask, 'Is flying safe?' but what they mean is, 'Is flying safe enough?' 'Is flying as safe as it used to be?' 'Is flying as safe as it could be?'

"Those of us here today—and the FAA employees ... around the country—know that the popular impression is not an accurate assessment of the system's condition ... I challenge any other field of activity to match [our] record of achievement. Moreover, I challenge any other field of activity to match the FAA's continuous pursuit of improvement. We must never let up in our relentless pursuit of excellence...

"Although the FAA is doing an outstanding job, the flying public feels it is getting something less than it has come to expect from air transportation. People don't always understand the problem—it is something of a puzzle .... Increasingly, the recognition that one piece is out of line leaves an impression that the whole doesn't fit together as it should.

"We are going to work *with* you—and that requires full involvement on all our parts—to identify and improve where progress is possible .... We cannot settle for anything less than excellence in safety, security, and service ...

"Excellence is not simply an FAA concern in improving public confidence. That commitment must begin in the boardrooms and extend throughout every corner of operations and training. We must be sure that, if there is a better way, we get it done that way. The executive management of every air carrier certificate holder is hereby on notice. If you do not comply with your obligations to maintain your fleets and fulfill the obligations of your operating certificates, you will not operate in the National Airspace. This goes for large air carriers as well as small ones. I recognize the excellent service that you provide to more than 400 million passengers every year. I also recognize that those passengers are asking you to do better. You must.

"Pilots, copilots, flight engineers, and other crewmembers are also on notice. If you are not medically qualified, if you are not drug free, if you aren't technically proficient, if you can't demonstrate your skills, you will not fly in the National Airspace ....

"The FAA is not alone. We know that we need public support .... from the aviation community .... The public is concerned now. The sooner we begin to work on the solutions, the brighter will be the future of aviation for all of our people. I seek your assistance, I need your support, and I have great confidence that the people of the FAA will respond to the challenges of the coming year to improve air transportation for the American Public."

PROPOSED RULE FOR HELICOPTER RESTRAINTS

FAA is accepting comments on a Notice of Proposed Rulemaking to amend FAR Part 27 and 29, which deal with the certification of normal and transport category rotorcraft. The proposals are designed to improve occupant protection during a survivable impact.

The proposed amendments are summarized as follows:

1. Addition of two emergency landing dynamic impact design standards for normal category rotorcraft seats and restraint systems.
2. Addition of a standard requiring use of standard anthropomorphic test dummy ("crash dummy") to assess seats and occupant restraints in simulated crash impacts.
3. Addition of performance standards for impact injury criteria.
4. An increase in the static load designs for seats and restraint systems by 170 to 300%.
5. An increase in the forward load factor by two to keep rotors and other items above and aft of the cabin from compromising the cabin in an impact.
6. Requirements for a safety belt and shoulder harness for each occupant at each seat.

Comments will be accepted until December 30, 1987 on Notice No. 87–4. Send three copies of your comments to FAA, AGC–204, Docket No. 25287, 800 Independence Ave., S.W., Washington, D.C. 20591.

LATEST FAA PUBLICATIONS

Vapor Lock Tests

"Procedures for Conducting Fuel System Hot Weather Operation Test" provides information and guidance for conducting fuel system hot weather operation tests in small airplanes. AC 23.691–1 shows the several factors that should be considered when making the evaluation. The circular is free from the DOT, Utilization and Storage Section, M–443.2, Washington, DC 20590.

WHAT A BARGAIN!

It is finally official! The Government Printing Office will start accepting subscriptions for FAA AVIATION NEWS at the yearly rate of $5.50 ($6.90 foreign). The new subscription rate is a nearly 60% decrease from the old $13.00 rate. Use the convenient self-mailer in the center of this issue. If it is missing, GPO's address is on page two. We look forward to plenty of new subscribers and the return of some "lost sheep." To echo a popular television commercial, "We thank you for your support."

• Helicopter Minimums

I interpret FAR 91.70 (minimum safe altitude) to mean that helicopters must comply with paragraphs (a), (b) and (c), unless they comply with routes or altitudes specifically prescribed for helicopters by the Administrator. If this interpretation is not correct, would you please explain this section.

C. N. Denney
Tampa, FL

Paragraph (d) of §91.79 permits helicopters to operate lower than the minimums specified in (b) and (c), if this may be done without hazard to persons or property on the surface. This is in addition to the requirements of (d) concerning compliance with routes or altitudes prescribed by the Administrator.

• State College Revisited

I must disagree with your answer in the May/June Instrument Corner concerning the ILS Rwy 24 approach from the holding pattern, at State College, PA. Your answer suggests that the 45°/180° procedure turn is the only acceptable maneuver for entering the glideslope course, when in fact the Airman's Information Manual confirms that there are a number of acceptable options, including the racetrack course, teardrop pattern, etc.

I make it a point to have all of my students (and the instructors who work for me) also use 90°/270° patterns, teardrops, and race tracks for course reversals. If a student is not made aware of his options during training, or worse, is led to believe that there are no options, when will he learn of them?

Furthermore, I have been told by other FAA officials that the phrase, "Final approach from holding fix not authorized," is being done away with. I was therefore surprised when the new FAA plate for Ephrata, WA, which I reviewed in February, still carried this note.

R.E. Gardner
Seattle, WA

We believe there was a misunderstanding about your original question, concerning the holding pattern at State College. We understood you to ask whether you could initiate the final approach from the holding pattern fix and altitude (4,000 feet) intercepting the glide from above. This would not be acceptable. AIM cautions against the hazards of encountering false signals and course reversals above the glideslope.

You are correct that any course reversal type of maneuver for ILS Rwy 24 at State College would be satisfactory. We quite agree that pilots in training should be introduced to all the options for course reversal procedures.

With regard to the notice, "Final approach from holding fix not authorized," it is true that the agency is in the process of reducing clutter on the IAP charts by eliminating that warning. Bear in mind that while these charts are re-issued every 60 days, actual revision is done at much less frequent intervals—which is why you may still see the phrase on your Ephrata, OR chart.

• Steel Wool Stashes

I take exception to your advice in the article on "Improvising for Survival," in the January/February 1987 issue of Aviation News, where you tell us you can use available bits of steel wool with a battery for starting a fire. As a pilot for more than 40 years, aircraft owner and FAA certificated mechanic I have never seen loose pieces of steel wool in an aircraft. The use of steel wool is not good practice on aluminum, although occasionally it is used in paint preparation. Why would it be left lying around in the cabin? If you do use it to create a spark across battery terminals I hope you are not near any leaking fuel or fuel vapors!

You also talk about removing a magneto, or control cables. These are almost impossible to salvage without special tools, not likely found in a survival kit. I don't belittle survival planning, but I think you ought to be realistic about the circumstances you are describing.

Robert Noyer
Vienna, VA

A point well taken, but cables, for example, have been cut by axes in an emergency.

FAA AVIATION NEWS welcomes comments from our readers. No anonymous letters will be used, but names will be withheld on request. Address: FAA AVIATION NEWS, AFS-810, Washington, D.C. 20591.

• What's In A Name?

Reference "Pilot Phraseology" in the March/April issue.

I notice that controllers in this area use "November" about ⅓ of the time. Most of the time it's "Cessna" (or even "Skyhawk") or "Delta" or "Douglas" (we've got some local DC-3's). This makes sense, as the three uninformative syllables of "November" are replaced by two syllables which are more specific and therefore more likely to get the attention of the called aircraft.

Seems like November is a more cumbersome handle for Air Traffic Operations to specify and promulgate.

J.B. Ingold
Delray Beach, FL

The Controller's Handbook authorizes the use of "November" as a prefix for aircraft identification—as well as the use of make and/or model or aircraft manufacturer's name, if known.

In reply to a caller, controllers usually repeat the same prefix given by the caller, or the prefix given on the data strip at their display, when available. However, when calling out traffic, controllers will be as specific in their identification as possible.

Your line of reasoning that "November" is nondescriptive and perhaps excessively time consuming makes good sense, but other options are not always available to the controller.

INSTRUMENT CORNER

• Dual Roles?

I would like clarification on several log book entry questions. The FAR allow private pilots to log time as PIC when sole manipulator of the controls: does this apply during an instrument training flight with a certified flight instructor? Could you not also log the time as dual instruction? And does that mean that for a 2.0 hour flight you could log 2.0 hours as PIC and also 2.0 hours of dual? Would IFR conditions alter the situation?

Second question: As a military aircrew member (but not a rated military pilot) can you legally log flight time to meet ATP flight time requirements? Say you have a civilian pilot certificate and are flying as weapons systems officer on board an F-4, with an F-4 instructor pilot.

Cliff Moriarty
Miami, FL

A private pilot receiving instruction during an instrument training flight in an aircraft for which he or she is rated may log the time spent actually manipulating the controls as PIC under FAR §61.51(c)(2)(i). It must be clearly understood, however, that flight experience acquired in this manner may be used solely to meet either the flight experience requirements for a certificate or rating, or the recent flight experience requirements under FAR Part 61. While the actual flight time may be logged under several columns in the pilot's log, i.e., pilot-in-command, instrument instruction received, cross-country, etc., no more than the total flight time may be logged. Thus a two-hour flight may not be logged for more than two hours total time.

As to your second question, the military services do not require a Weapons System Officer (WSO) in a F-4 military aircraft to be a rated military pilot. Therefore, flight experience gained in the F-4 aircraft solely as a WSO is not creditable as flight experience toward a pilot certificate or rating under FAR Part 61. However, should the pilot of the F-4 aircraft also hold a valid FAA flight instructor certificate, he or she may give and certify instruction given in the F-4 aircraft as flight instruction in airplanes. That instruction, when logged in accordance with FAR §61.51(b), is then creditable toward meeting the 1500 hour total flight experience requirements of FAR §61.155(b)(2) for the ATP certificate.

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Famous Flyers *(continued from page 13)*

Academy became the basic training base for the 14th Army Air Force. At this point the instructors were given a choice of joining the Enlisted Reserve (inactive duty as a flight instructor) or the draft board would be notified resulting in active duty with a recommendation for infantry duty. Needless to say, inactive duty looked the most attractive and offered the only hope for continuing to fly in wartime.

In July of 1945 Duane's part in the war effort was officially over. He packed up his family and headed back home to Peoria. With the glut of ex-military pilots on the job market, aviation opportunities were sparse. Duane came to the conclusion that he would have to create his own job if he wanted to stay in aviation. The closed Kewanee, IL Airport seemed a most likely site. He decided to reopen the airport with an FBO and a Piper dealership. With three of his brothers to help man the FBO, the grand opening was planned for July 28, 1946. The publicity promised the public a fly-in breakfast and an airshow from 10:30 until 4:30 p.m. As mentioned earlier, the professional airshow pilots were unavailable, but the Cole Brothers Airshow was born.

For the next four years Duane tried to run Kewanee and cater to the increasing demands for the services of the Cole Brothers Airshow. It finally came to the point of deciding which would be the most profitable and enjoyable. The airshow won.

The CAA (predecessor of the FAA) at this time had only some loosely written rules concerning airshows. The only real requirement was a letter notifying the CAA of the event. However, with the popularity of airshows increasing, and with it the number of fatal accidents involving spectators, the cry was being heard for legislation to ban all air meets. In 1952, one CAA inspector took it upon himself to cancel a show after the Cole Brothers had traveled 600 miles to participate. Duane was not about to let the situation go without a fight. He called the CAA's Deputy Administrator, who admitted there was a problem and that the present aerobatic rules needed to be rewritten. Duane was asked to help the regional office draft a set of new regulations. Based on CAA Inspector Bill Wagner's aerobatic instructor experience, as well as CAA terminology, and Duane knowledge of air exhibition flying, the regulations were submitted to Washington Headquarters and were adapted almost verbatim.

In 1958 the family moved to Fort Wayne, IN, where Duane became manager of the Fort Wayne Air Service. It was here he started what was probably the first flight training school in the world devoted entirely to aerobatics. Duane started to cut back slowly on the number of airshows he participated in over the year since his brothers were becoming involved in other aviation ventures. But the lure of the air won again and by 1961 another manager took over at Fort Wayne so Duane could go back to what he loved the best.

By this time the Cole Brothers Airshow was really a family affair which included Duane's wife Judy as a wingwalker and his son Rolly as one of the pilots. After participating in the National Championship Aerobatic Contests in the 1950's, Duane would finally win first place in 1962. He also flew as a member of the three-man U.S. Aerobatic Team in the 1962 World Contest in Budapest, Hungary. Our team came in fourth place.

Duane was at the top of the aviation world when tragedy struck unexpectedly in 1963. An improperly overhauled engine tore away from its mounts in flight causing the death of two persons—one of which was Duane's son Rolly. Swearing never to fly again, Duane went into a deep depression. To overcome it, Duane began writing a book dedicated to his son's memory, a reminiscence about their lives together. The therapy worked. By 1964 Duane was again involved in aviation: He agreed to direct a stock plane air race in Pendleton, OR; overcame his aversion to flying his own airplane; produced a major air race in Reno, NV (We know it now as the Reno Air Races.); and again won first place in the National Championship Aerobatic Contest.

From that time on Duane has gone from strength to strength. From adversity to prosperity and back again throughout his life, he continues to soar to new heights. His airplanes with the familiar "Duane Cole" printed upside down (or rightside up, depending on your perspective) are still seen all over the country, wherever airplane lovers get together. He still teaches aerobatics, writes books on his life and aerobatics, and has even produced two instructional video tapes on aerobatic flying. Earlier this year Duane Cole was elected to the Aerobatic Hall of Fame: not bad for a man told he would never make it in aerobatics. ■